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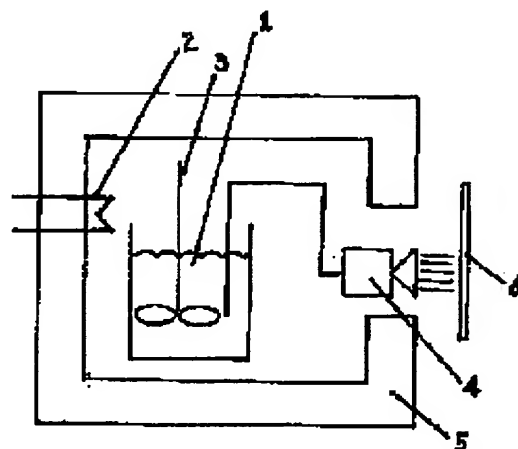
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## (54) METHOD FOR PRESERVING AND APPLYING COLD CURING COATING MATERIAL

### (57)Abstract:

PURPOSE: To provide means effective for simplifying intricate stages of metering and mixing which are heretofore problems with a coating material to be cured at ordinary temp. and for shortening the time required for drying in combination by mixing a principal agent and a hardener.

CONSTITUTION: This method consists of the coating material 1 which is prepd. by previously mixing the principal material and the hardener, an equipment for cooling and preserving this coating material down to  $\leq 0^{\circ}\text{C}$  or  $\leq -5^{\circ}\text{C}$  according to the kinds of functional groups and a coating machine 4 which is heat insulated and protected to be kept at  $0^{\circ}\text{C}$  or  $\leq -5^{\circ}\text{C}$ . The reaction of the principal agent and the hardener at ordinary temp. is effectively prevented and the two-pack type coating material is handled with the ease similar to the ease for handling a one-pack type baking coating material.



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**CLAIMS**

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[Claim(s)]

[Claim 1] The preservation and the method of application of a room-temperature-setting coating which are characterized by keeping both the component at 0 degree C or less in -5 degrees C or less and the latter after mixed in the former till paint in the room-temperature-setting coating which carries out bridge formation hardening with the combination of the resin and the poly isocyanate which have a hydroxyl group, or the combination of the resin which has a glycidyl group, and the resin which has an aliphatic series amino group.

[Claim 2] The preservation and the method of application of a room-temperature-setting coating according to claim 1 which are characterized by including aliphatic series tertiary amine 200 ppm [ or more ] or an organic tin compound 30 ppm or more as an indispensable component in a coating component.

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[Translation done.]

combination of a hydroxyl group, an isocyanate radical and a GURIJIRU radical, and the aliphatic series amino group is especially used as suitable combination from a viewpoint of the compatibility between resin of base resin and a curing agent, and a bridge formation rate and the various engine performance of a hardening paint film. Namely, in the former, the macromolecule which has two or more hydroxyl groups is used for the resin which constitutes base resin. The macromolecule or oligomer which has two or more isocyanate radicals in a curing agent It is possible to use the macromolecule or oligomer which uses the poly isocyanate for the resin which uses (both are hereafter called the poly isocyanate), or constitutes base resin conversely, and has two or more hydroxyl groups in a curing agent. In the latter, the macromolecule which has two or more glycidyl groups is used for the resin which constitutes base resin. It is possible to use the macromolecule or oligomer which has two or more GURIJIRU radicals at a curing agent for the resin which constitutes base resin conversely, using the macromolecule or oligomer which has two or more aliphatic series amino groups in a curing agent using the macromolecule which has two or more aliphatic series amino groups.

[0006] Various kinds of additive and solvents, such as various pigments besides [ which has two or more above-mentioned functional groups ] the resin as a macromolecule, a defoaming agent, lubricant, a pigment agent, and a hardening accelerator, are contained in the base resin of 2 acidity-or-alkalinity coatings which constitute this invention, if the process of a common coating is followed, a pigment will be first distributed by the distributed approach of well-known common use in the solution of resin, and an additive and a suitable quantity of a solvent are added and stirred after that. If a curing agent may consist of the macromolecule or the oligomer itself which has a functional group in the resin which constitutes base resin, and two or more functional groups which can react, or may contain a solvent and the additive of the amount of some of a hardening accelerator and follows a general process, it will stir a macromolecule or oligomer and a solvent, and an additive until it will be in a homogeneity condition.

[0007] On the occasion of mixing of the base resin and the curing agent of 2 liquid type coating, the desirable mixing ratio is set up by the weight ratio, and it is usually considered so that the functional-group equivalent in base resin and the functional-group equivalent in a curing agent may become almost equal. Therefore, although it is important to carry out weighing capacity of both to accuracy, and to mix in order to make base resin and a curing agent react effectively and to make bridge formation produce smoothly, this is a process which requires trouble and is easy to produce an activity mistake. Moreover, after mixing, in order that both functional group may begin crosslinking reaction with a moderate reaction rate, with progress of a reaction, a coating loses a fluidity and results in gelation soon. A period until it results in gelation from mixing can be painted, is called working life, and does not ask the class of functional group, but is a value with 3 - 10 common hours at a room temperature. That is, when dealing with 2 acidity-or-alkalinity coatings near the room temperature after mixing of base resin and a curing agent, preservation and paint must be mixed with weighing capacity on actual each time, when it must end promptly within the set working life, therefore working hours differ from a work site also, for example in the 2 same acidity-or-alkalinity coatings. Moreover, since the activity residue cannot stop crosslinking reaction, either, the reuse is impossible. However, even if it is after mixing of base resin and a curing agent, in the combination of -5 degrees C or less, a glycidyl group, and the aliphatic series amino group, crosslinking reaction stops mostly below 0 degree C at the low temperature below a certain constant temperature, i.e., the combination of a hydroxyl group and an isocyanate radical. Although there is [ an activity ] 2 acidity-or-alkalinity coatings at an intense-cold term since generally avoids the above-mentioned phenomenon The above-mentioned phenomenon is used for reverse in this invention. By the cooling approach suitable after mixing of base resin and a curing agent In order to cool at 0 degree C or less in the case of 2 acidity-or-alkalinity coatings with which it consists of -5 degrees C, a glycidyl group, and an aliphatic series amino group in the case of 2 acidity-or-alkalinity coatings which consist of combination of a hydroxyl group and an isocyanate radical and to stop crosslinking reaction intentionally, Also although working life is prolonged to infinity and calls it 2 acidity-or-alkalinity coatings after mixing, the reuse covering long duration becomes possible, and the complicated activity of weighing capacity or mixing is suppressed to the minimum.

[0008] That is, it has the cooler 1 (2 of drawing 1 ) which it is mixed beforehand, and preservation and an activity are presented with 2 acidity-or-alkalinity coatings which constitute this invention (1 of drawing 1 ), they combine base resin and a curing agent, and constitutes this invention. In addition, although all the approaches of well-known common use including a mere refrigerant are applied and being dealt in a cooler, in order to avoid freezing of the coating by too much cooling, it is not desirable to lower the temperature at -20 degrees C or less. Moreover, in a temperature fall process, in order to lessen the temperature distribution in a coating as much as possible, it is desirable to have mixers, such as an agitator (3 of drawing 1 ) and a

circulating pump. Although all the things of well-known common use are applied and being dealt also in the coater (4 of drawing 1 ) which constitutes this invention, a roll coater, a spray coater, etc. are especially desirable. And the thing which are depended on a coater after mixing of base resin and a curing agent and which is surrounded with the suitable heat insulator (5 of drawing 1 R> 1) in addition to the cooler is still more desirable [ a coating ] so that all may be maintained at low temperature, until it oozes or results in the regurgitation.

[0009] Bridge formation hardening advances slowly under ordinary temperature as well as what depends the paint film after paint on the method of application of 2 usual acidity-or-alkalinity coatings. A paint film can be warmed by approaches, such as spraying of warm air and an exposure of an infrared lamp, bridge formation hardening can be promoted, and it is an approach effective in compaction of a construction period, and large-scale equipment is needed and the costs for the maintenance also increase. Not only in 2 acidity-or-alkalinity coatings but generally bringing bridge formation hardening forward by addition or loading of a hardening accelerator is made, and it is performed convenient at all with the baking finish which especially bridge formation hardening takes heating. The organometallic compound which contains an acid inorganic [ various kinds of ] and organic, a base or tin, and titanium as a hardening accelerator is mentioned. Also by addition of these hardening accelerators, although the minimum temperature required for bridge formation hardening does not descend, it can promote remarkably the bridge formation hardening reaction under the same temperature. In 2 acidity-or-alkalinity coatings, since working life became short by addition of these hardening accelerators, the addition was not what can raise the effectiveness which is restricted very much to a minute amount and leads to compaction of a large construction period.

[0010] Under preservation of 2 acidity-or-alkalinity coatings by this invention, and paint conditions, 2 acidity-or-alkalinity coatings become comparatively usable [ the hardening accelerator of a large quantity ], without receiving constraint of working life, since it is maintained at the low temperature in which bridge formation hardening is impossible. however, by addition of a large quantity, since a hardening accelerator may also promote decomposition of the paint film after bridge formation hardening, the class suitable for the addition limits it -- having -- an organic base -- organic tin compounds, such as aliphatic series tertiary amine, such as triethylamine and a trimethylamine, and a dibutyl tin JIRAU rate, and dibutyl tin diacetate, are desirable above all.

[0011] Therefore, in 2 acidity-or-alkalinity coatings which constitute this invention, it is desirable that aliphatic series tertiary amine 200 ppm [ or more ] or an organic tin compound 30 ppm or more is contained as an indispensable component for acceleration of bridge formation hardening, and it can aim at compaction or less [ of the bridge formation setting time / conventional ] to 1/2 by addition of these indispensable components in them. In addition, as for the addition to 2 acidity-or-alkalinity coatings of these hardening accelerators, it is desirable to carry out, after cooling to mixing of base resin and a curing agent and subsequent predetermined temperature is completed.

[0012]

[Example]

[Example 1] (when the combination of the resin and the poly isocyanate which have a hydroxyl group is chosen)

After adding and stirring xylene 19g to 41g (a "AKURIDIKKU A-800" Dainippon Ink product, 50% of nonvolatile matters, hydroxyl value 50) of resin which has a hydroxyl group, 30g of titanium oxide was added and it distributed strongly by the glass bead mold disperser. In this way, 90g of mixture after the completed distribution was used as base resin. 10g of mixture as for which added 3g of butyl acetate, and it was independently stirred and made to poly isocyanate ("Coronate EH" Japan Polyurethane product, 100% [ of nonvolatile matters ], 23% of NCO contents) 7g was used as the curing agent. The mixing ratio (weight ratio) of base resin and a curing agent is set to 9:1. After mixing 90g of base resin, and 10g of curing agents, after cooling to -5 degrees C with a refrigerant it to be \*\*, the trial of following A-C was presented.

A. Time amount until it results in gelation from working life measurement mixing was measured for every hour.

B. Xylene 15g was further added to 50g of mixture of drying-time measurement base resin and a curing agent, and it applied with the spray coater on the aluminum plate maintained at the room temperature. Coverage 70 g/m<sup>2</sup>. From immediately after spreading, the fingertip described the painted surface lightly and time amount until the trace stops sticking was measured every 10 minutes.

The painted surface which passed for 48 hours after <TXF FR=0001 HE=080 WI=080 LX=0200 LY=0300>

C. xylol love test paint was rubbed with xylol impregnation gauze, having applied about 50g load, and the count of a round trip until exfoliation or the dissolution until it results in a substrate at a painted surface

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] The coating (2 liquid type coating is called below) which mixes and paints two kinds of resin liquid, base resin and a curing agent, and carries out bridge formation hardening in ordinary temperature has been liked and used to the coated object exposed especially to a severe condition, in order to form the paint film excellent in a water resisting property, chemical resistance, weatherability, abrasion resistance, etc. the combination of the resin which has the combination or glycidyl group of the resin and the poly isocyanate which have a hydroxyl group, and the resin which has an aliphatic series amino group is chiefly adopted as a viewpoint to these base resin and the curing agent of the compatibility between resin, and a bridge formation rate and the various engine performance of a hardening paint film, and when especially the former boils weatherability and thinks as important, it is supposed that it is suitable of the latter when thinking chemical resistance and abrasion resistance as important much more. While it has the features on the above engine performance, there are also many handling-problem points resulting from mixing base resin and a curing agent and advancing a hardening reaction simultaneously, and this invention relates to the new approach for solving such a handling-problem point, and saving and painting 2 liquid type coating easily.

[0002]

[Description of the Prior Art] Although 2 liquid type coating can form the paint film of the engine performance which was excellent like previous statement If opposite side base resin and a curing agent are measured strictly, and are blended and both are not fully mixed, after mixing of the point of being difficult to get, base resin, and a curing agent the original engine performance Crosslinking reaction cannot be stopped. The activity residue Very much, since the point which cannot do a reuse and base resin, and a curing agent are pressed down to comparison-low molecular weight, in that the long drying time is required etc., paint, paint in a division site, and its management are troublesome to gelation, therefore are not extensively used for it now.

[0003]

[Problem(s) to be Solved by the Invention] It waited for the appearance of the approach of suppressing measuring of base resin and a curing agent, and a mixed activity to the minimum, and being able to carry out the reuse of the activity residue moreover, and making the drying time after paint shorten desirably according to the above situation.

[0004]

[Means for Solving the Problem] this invention person resulted in this invention in 2 liquid type coating paying attention to crosslinking reaction stopping practically below at the fixed temperature which has also been after mixing of base resin and a curing agent. The content of this invention is explained in full detail below.

[0005] Hardening of the paint film of 2 liquid type coating must advance, when the molecule of a curing agent with comparatively small molecular weight constructs a bridge mutually in the macromolecule chain of the resin in base resin with molecular weight big general comparatively, and for that purpose, two or more functional groups required for crosslinking reaction must exist in the macromolecule which constitutes base resin and a curing agent. In order that these functional groups may react in the \*\*\*\*\* ordinary temperature from 15 degrees C to 30 degrees C, The combination is restricted greatly. For example, a hydroxyl group and an isocyanate radical, The amino group, an isocyanate radical and a GURIJIRU radical, the aliphatic series amino group and a GURIJIRU radical, a sulfhydryl group, etc. It can mention as an example of the combination of the functional group which can react in ordinary temperature. Generally the

appears was measured.

[0013] [Example 2] (when a hardening accelerator is added)

The same procedure as an example 1 was followed except [ all ] having added and stirred triethylamine 0.4g after cooling 90g of base resin, and 10g of curing agents at mixing and -5 degrees C.

[Example 1 of a comparison] The same procedure as an example 1 was followed except [ all ] having maintained at ordinary temperature as it is after mixing 90g of base resin, and 10g of curing agents.

[Example 3] (when the combination of the resin which has a glycidyl group, and the resin which has an aliphatic series amino group is chosen)

29g (the "Epicoat 1001" shell company product, weight per epoxy equivalent 475, 100% of nonvolatile matters) of resin which has a glycidyl group -- the inside of 30g toluene -- dissolving -- a 7g xylene and 24g titanium oxide -- in addition, it distributed strongly by the glass bead mold disperser. In this way, 90g of mixture after the completed distribution was used as base resin. 10g of mixture as for which added isobutanol 3g to 7g (the "good MAIDO G-623" Tohto Kasei Co., Ltd. product, amine \*\* 310, 100% of nonvolatile matters) of resin which has an aliphatic series amino group, and it was independently stirred and made to it was used as the curing agent. The mixing ratio of base resin and a curing agent is set to 9:1. After mixing 90g of base resin, and 10g of curing agents, after cooling to 0 degree C with a refrigerant it to be \*\*, the same trial as an example 1 was presented.

[Example 2 of a comparison] The same procedure as an example 3 was followed except [ all ] having maintained at ordinary temperature as it is after mixing 90g of base resin, and 10g of curing agents.

[A table 1]

	実施例 1	実施例 2	比較例 1	実施例 3	比較例 2
可使時間 (時間)	1 6 8 <	1 6 8 <	7	1 6 8 <	1 0
乾燥時間 (分)	3 0	1 0	3 0	2 0	2 0
キシロールラブ試験	5 0	1 0 0 <	5 0	6 0	6 0

[0014]

[Effect of the Invention] Since the working life of 2 acidity-or-alkalinity coatings was substantially extended by adopting the preservation of 2 liquid type coating and the method of application by this invention, the same simple management as 1 acidity-or-alkalinity baking paint was attained, and it became clear to contribute to the increase in efficiency of paint greatly. Moreover, since working life was not affected but the drying time was shortened, it became clear that effectiveness is large also at compaction of a paint construction period.

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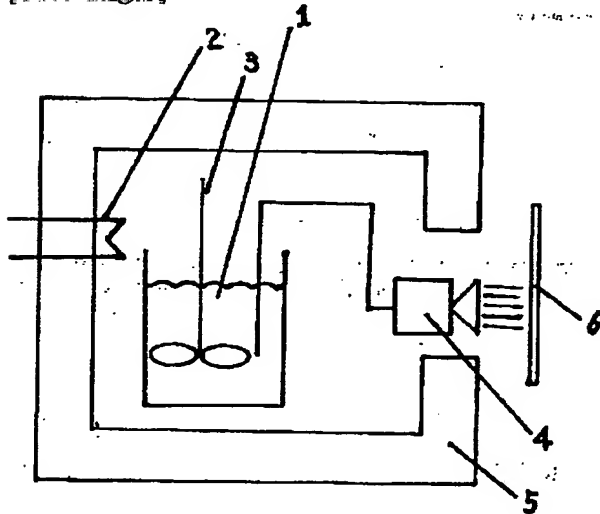
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DRAWINGS

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[Drawing 1]



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[Translation done.]

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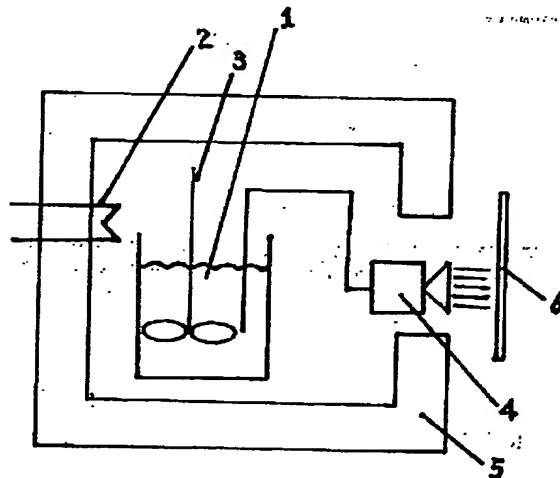
(54)【発明の名称】 常温硬化塗料の保存および塗装方法

(57)【要約】

【目的】 主剤と硬化剤を混合することで常温下で硬化する塗料の問題点となっていた計量、混合の煩雑な工程を簡素化し、また、乾燥に要する時間を併せて短縮する、有効な手段を提供する。

【構成】 主剤と硬化剤を予め混合した塗料およびこれを、官能基の種類に応じて0℃以下または-5℃以下にまで冷却保存する設備並びに0℃または-5℃以下に保たれるよう、断熱保護された塗装機よりなる。

【効果】 低温下での主剤と硬化剤の反応が有効に抑止され2液性塗料が1液性焼付け塗料と同様の手軽さで扱える。





## 【特許請求の範囲】

【請求項 1】 水酸基を有する樹脂とポリイソシアネートとの組合せ、またはグリシジル基を有する樹脂と脂肪族アミノ基を有する樹脂との組合せにより架橋硬化せしめる常温硬化塗料において、その両成分を混合のうえ、塗装時まで前者においては $-5^{\circ}\text{C}$ 以下、後者においては $0^{\circ}\text{C}$ 以下に保つことを特徴とする常温硬化塗料の保存および塗装方法。

【請求項 2】 塗料成分中に $200\text{ppm}$ 以上の脂肪族 3 級アミンまたは $30\text{ppm}$ 以上の有機錫化合物を必須成分として含ませることを特徴とする請求項 1 記載の常温硬化塗料の保存および塗装方法。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】主剤と硬化剤の 2 種類の樹脂液を混合して塗装し、常温にて架橋硬化せしめる塗料（以下 2 液型塗料と称する）は、耐水性、耐薬品性、耐候性、耐磨耗性等に優れた塗膜を形成するため、とくに過酷な条件に晒される被塗物に対して好んで用いられてきた。樹脂相互の相溶性、架橋速度や硬化塗膜の各種性能の観点から、これらの主剤と硬化剤には水酸基を有する樹脂とポリイソシアネートの組合せまたはグリシジル基を有する樹脂と脂肪族アミノ基を有する樹脂の組合せが専ら採用されており、前者は耐候性をとくに重視する場合、後者は耐薬品性や耐磨耗性を一段と重視する場合に適しているとされている。上記のような性能上の特長を有する反面、主剤と硬化剤を混入して硬化反応を進行させることに起因する数々の取扱い上の問題点も同時にあり、本発明はこのような取扱い上の問題点を解決し 2 液型塗料を容易に保存および塗装するための新規な方法に関する。

## 【0002】

【従来の技術】2 液型塗料は、既述のように優れた性能の塗膜を形成しうが、反面主剤と硬化剤を厳格に計量して配合し、また両者を十分に混合させなければ、本来の性能を得難いという点、主剤と硬化剤の混合後は、架橋反応を止めることができず、使用残分は、ゲル化に至って、再使用ができない点、また、主剤、硬化剤ともに比較的分子量に抑えてあるため、長い乾燥時間を要する点等で、塗装作業、とりわけ現場での塗装作業やその管理が煩わしく、そのため、現在広汎には、使用されていない。

## 【0003】

【発明が解決しようとする課題】以上の状況により、主剤と硬化剤の計量や混合の作業を最小限に抑えしかも使用残分が再使用でき、また望ましくは塗装後の乾燥時間を短縮せしめる方法の出現が待たれていた。

## 【0004】

【課題を解決するための手段】本発明者は、2 液型塗料において、主剤と硬化剤の混合後であってもある一定の

温度以下では実用上架橋反応が停止することに着目し本発明に至った。以下に本発明の内容を詳述する。

【0005】2 液型塗料の塗膜の硬化は、一般的に、比較的分子量の大きな主剤中の樹脂の高分子鎖を比較的分子量の小さな硬化剤の分子が相互に架橋することにより進行し、そのためには、主剤および硬化剤を構成する高分子中に、架橋反応に必要な官能基が複数存在しなくてはならない。 $15^{\circ}\text{C}$ から $30^{\circ}\text{C}$ までの云ゆる常温においてこれらの官能基が反応しなければならないため、その組合せが大きく制限され、たとえば、水酸基とイソシアネート基、アミノ基とイソシアネート基、グリシジル基と脂肪族アミノ基、グリシジル基とメルカプト基等を、常温で反応しうる官能基の組合せの例として挙げるのができ、この内、主剤と硬化剤の樹脂相互の相溶性、架橋速度や硬化塗膜の各種性能の観点からとくに水酸基とイソシアネート基およびグリシジル基と脂肪族アミノ基の組合せが好適な組合せとして一般的に用いられている。すなわち、前者においては、主剤を構成する樹脂に複数の水酸基を有する高分子を用い、硬化剤に複数のイソシアネート基を有する高分子またはオリゴマー（以下、両者をポリイソシアネートと称する）を用いるか、逆に主剤を構成する樹脂にポリイソシアネートを用い硬化剤に複数の水酸基を有する高分子またはオリゴマーを用いることが考えられ、後者においては、主剤を構成する樹脂に複数のグリシジル基を有する高分子を用い、硬化剤に複数の脂肪族アミノ基を有する高分子またはオリゴマーを用いるか、あるいは逆に主剤を構成する樹脂に複数の脂肪族アミノ基を有する高分子を用い、硬化剤に複数のグリシジル基を有する高分子またはオリゴマーを用いることが考えられる。

【0006】本発明を構成する 2 液性塗料の主剤には、上述の複数の官能基を有する高分子としての樹脂の他、各種顔料、消泡剤、潤滑剤、顔料分散剤、硬化促進剤等の各種の添加剤および溶剤が含まれており、一般的な塗料の製法に従うと先ず樹脂の溶液中に顔料を公知慣用の分散方法にて分散させ、その後に添加剤および適量の溶剤を添加して攪拌する。硬化剤は、主剤を構成する樹脂中の官能基と反応しうる複数の官能基を有する高分子またはオリゴマーそのものよりなるか、あるいは、溶剤や硬化促進剤の若干量の添加剤を含む場合があり、一般的な製法に従うと、高分子またはオリゴマーと溶剤および添加剤を均一状態になるまで攪拌する。

【0007】2 液型塗料の主剤と硬化剤の混合に際しては、通常、好ましい混合比が重量比により設定されており、主剤中の官能基当量と硬化剤中の官能基当量が、ほぼ等しくなるよう配慮されている。従って、主剤と硬化剤を有効に反応させ架橋を円滑に生ぜしめるためには、両者を正確に秤量し混合することが重要であるが、これは手数を要し、また作業ミスを生じやすい工程である。また、混合後は両者の官能基が適度な反応速度で架橋反

応を始めるため、やがて反応の進行に伴い塗料が流動性を失いゲル化に至る。混合よりゲル化に至るまでの期間は塗装が可能であり、可使時間と呼ばれ、官能基の種類を問わず、室温にて3～10時間が一般的な値である。つまり2液性塗料は、主剤と硬化剤の混合後、室温近傍で取扱う場合、保存および塗装は、定められた可使時間内に速かに終了しなければならず、そのため、例えば同一の2液性塗料においても作業時間や作業場所が異なるときには、實際上、その都度秤量と混合を行わねばならない。また、使用残分も架橋反応を止めることができないため、再使用は不可能である。しかし、主剤と硬化剤の混合後であっても、ある一定温度以下の低温、すなわち、水酸基とイソシアネート基の組合せでは-5℃以下、グリシジル基と脂肪族アミノ基の組合せでは0℃以下でほぼ架橋反応が停止する。一般には上記現象を回避するため2液性塗料は厳寒期には使用を控えるが、本発明では、逆に上記現象を利用し、主剤と硬化剤の混合後に適当な冷却方法により、水酸基とイソシアネート基の組合せからなる2液性塗料の場合は-5℃、グリシジル基と脂肪族アミノ基からなる2液性塗料の場合は0℃以下に冷却し、架橋反応を意識的に停止させるため、可使時間が無限に延び、混合後の2液性塗料といえども長時間にわたる再使用が可能になり、秤量や混合の煩雑な作業が最小限に抑えられる。

【0008】すなわち、本発明を構成する2液性塗料は、主剤と硬化剤を予め混合されて保存と使用に供され（図1の1）併せて本発明を構成する冷却機1（図1の2）が備えられる。尚、冷却機は単なる冷媒を含め公知慣用の方法全てが適用されうるが、過度な冷却による塗料の凍結を避けるため、-20℃以下に降温することは好ましくない。また降温過程において、塗料中の温度分布を極力少なくするため、攪拌機（図1の3）や循環ポンプ等の混合機を備えることが好ましい。本発明を構成する塗装機（図1の4）も、公知慣用のもの全てが適用されうるが、とくにロールコーター、スプレーコーター等が好ましい。そして、塗料は、主剤と硬化剤の混合後から、塗装機による滲出あるいは吐出に至るまで全て低温に保たれるよう、冷却機に加えて、適当な断熱材（図1の5）で囲まれていることが更に好ましい。

【0009】塗装後の塗膜は、通常の2液性塗料の塗装方法によるものと同じく常温下において緩慢に架橋硬化が進行する。温風の吹付けや赤外線ランプの照射等の方法により塗膜を加温して架橋硬化を促進させることもでき、工期の短縮には有効な方法であるが、大規模な装置を必要とし、またその維持のための費用もかさむ。硬化促進剤の添加あるいは増量により架橋硬化を早めることは2液性塗料に限らず一般的になされており、とくに架橋硬化に加熱を要する焼付け塗料では、何ら支障なく行われている。硬化促進剤としては、各種の、無機および有機の酸、塩基またはスズ、チタンを含む有機金属化合

物が挙げられる。これらの硬化促進剤の添加によっても、架橋硬化に必要な最低温度は、降下するものではないが、同一温度下での架橋硬化反応を著しく促進することができる。2液性塗料では、しかし、これらの硬化促進剤の添加により可使時間が短くなるため、その添加量はごく微量に限られ、大幅な工期の短縮につながる効果を上げるものではなかった。

【0010】本発明による2液性塗料の保存および塗装条件下では、2液性塗料は、架橋硬化が不可能な低温に保たれているため、可使時間の制約を受けることなく、比較的大量の、硬化促進剤の使用が可能となる。ただ、硬化促進剤は大量の添加により、架橋硬化後の塗膜の分解をも促進する場合があるため、その添加に適する種類が限定され、有機の塩基、就中、トリエチルアミン、トリメチルアミン等の脂肪族3級アミンおよびジブチル錫ジラウレート、ジブチル錫ジアセテート等の有機錫化合物が好ましい。

【0011】従って、本発明を構成する2液性塗料には、架橋硬化促進のため200ppm以上の脂肪族3級アミンまたは30ppm以上の有機錫化合物が必須成分として含まれることが好ましく、これらの必須成分の添加により架橋硬化時間の従来の1/2以下への短縮を図ることができる。尚、これらの硬化促進剤の2液性塗料への添加は、主剤と硬化剤の混合およびその後の所定温度への冷却が終了した後に行うことが好ましい。

【0012】

【実施例】

【実施例1】（水酸基を有する樹脂とポリイソシアネートとの組合わせを選択した場合）

30 水酸基を有する樹脂（「アクリディックA-800」大日本インキ（株）製品、不揮発分50%、水酸基価50）41gにキシレン19gを加えて攪拌した後、酸化チタン30gを加えてガラスビーズ型分散機で強く分散した。こうしてできた分散後の混合物90gを主剤とした。別にポリイソシアネート（「コロネートEH」日本ポリウレタン（株）製品、不揮発分100%、NCO含有量23%）7gに酢酸ブチル3gを加えて攪拌してできた混合物10gを硬化剤とした。主剤と硬化剤の混合比（重量比）は9：1とする。主剤90gと硬化剤10gを混合後、速かに冷媒にて-5℃まで冷却の後、下記A～Cの試験に供した。

A. 可使時間測定

混合よりゲル化に至るまでの時間を1時間毎に測定した。

B. 乾燥時間測定

主剤と硬化剤の混合物50gに、更にキシレン15gを加え、室温に保ったアルミニウム板上にスプレーコーターにて塗布した。塗布量70g/m<sup>2</sup>。塗布直後より、指先に塗面に軽く触れ、その痕跡がつかなくなるまでの時間を10分毎に測定した。

## C. キシロールラブ試験

塗装後48時間経過した塗装面をキシロール含浸ガーゼにて、約50gの荷重をかけてこすり、塗装面に、下地に至るまでの剥離または溶解が現れるまでの往復回数を測定した。

【0013】〔実施例2〕（硬化促進剤を添加した場合）

主剤90gと硬化剤10gを混合、-5℃に冷却の後、トリエチルアミン0.4gを加えて攪拌した以外は、全て実施例1と同じ手順に従った。

〔比較例1〕主剤90gと硬化剤10gを混合後、そのまま常温に保った以外は、全て実施例1と同じ手順に従った。

〔実施例3〕（グリシジル基を有する樹脂と脂肪族アミノ基を有する樹脂との組合せを選択した場合）

グリシジル基を有する樹脂（「エピコート1001」シ\*

\*エル社製品、エポキシ当量475、不揮発分100%）29gを30gのトルエン中に溶解し、7gのキシレンおよび24gの酸化チタンを加えて、ガラスビーズ型分散機で強く分散した。こうしてできた分散後の混合物90gを主剤とした。別に、脂肪族アミノ基を有する樹脂（「グッドマイドG-623」東都化成（株）製品、アミン価310、不揮発分100%）7gにイソブタノール3gを加えて攪拌してできた混合物10gを硬化剤とした。主剤と硬化剤の混合比は9：1とする。主剤90gと硬化剤10gを混合後、速かに冷媒で0℃まで冷却の後、実施例1と同じ試験に供した。

〔比較例2〕主剤90gと硬化剤10gを混合後、そのまま常温に保った以外は全て実施例3と同じ手順に従った。

【表1】

	実施例1	実施例2	比較例1	実施例3	比較例2
可使時間（時間）	168<	168<	7	168<	10
乾燥時間（分）	30	10	30	20	20
キシロールラブ試験	50	100<	50	60	60

## 【0014】

【発明の効果】本発明による2液型塗料の保存および塗装方法を採用することにより、2液性塗料の可使時間が大幅に伸びるため、1液性焼付塗料と同様の簡素な管理が可能となり、塗装作業の効率化に大きく寄与することが明らかになった。また、可使時間に影響を与えず、乾燥時間を短縮できることから、塗装工期の短縮にも効果

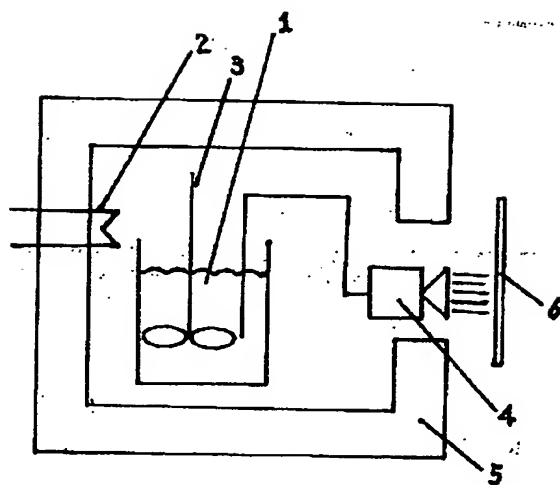
【図面の簡単な説明】

【図1】本発明の概念図。

【符号の説明】

- 1 主剤と硬化剤を混合した後の2液性塗料
- 2 冷却機
- 3 攪拌機
- 4 塗装機
- 5 断熱材
- 6 被塗物

【図1】



フロントページの続き

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